



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
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DALLAS, TX 75202-2733

OCT 22 2008

Jon L. Craig
Director, Water Quality Division
Oklahoma Department of Environmental Quality
707 North Robinson Avenue
P.O. Box 1677
Oklahoma City, OK 73101-1677

Dear Mr. Craig:

Re: Final EPA Action on Oklahoma 2008 Section 303(d) List

Thank you for your September 16, 2008, submission of Oklahoma's 2008 Integrated Report and section 303(d) list of water quality limited segments. The Environmental Protection Agency (EPA) reviewed the submission and supporting documentation, and determined that the 2008 section 303(d) list meets the requirements of the Clean Water Act and EPA's implementing regulations. These requirements and a summary of EPA's review of Oklahoma's compliance with these regulations are described in the enclosed decision document. By this final action, EPA approves the State's decisions regarding all segments and associated pollutants identified in the final 2008 section 303(d) list, and the associated priority rankings for development of total maximum daily loads (TMDLs).

Oklahoma's 2008 section 303(d) list now includes 743 waterbody segments and 1,758 segment-pollutant combinations. EPA recognizes that Oklahoma agencies made significant progress in reducing the number of segments previously classified as having insufficient information to assess water quality conditions by monitoring 140 additional segments in this listing cycle. These efforts resulted in an increase in section 303(d) listed segments, and an increase in numbers of segments reported as attaining applicable water quality standards.

EPA also recognizes that the State of Oklahoma made progress toward meeting the deadline for submittal of the Integrated Report. As in past years, Oklahoma Department of Environmental Quality (ODEQ) staff sent a draft version of the section 303(d) list to EPA, including the rationales for not including specific waterbody segments on the list. ODEQ staff patiently answered questions and provided additional documentation, upon request by EPA. This information and assistance was very helpful in expediting EPA's review of the final submission. Please do not hesitate to let me know if there is anything we can do to enable Oklahoma to meet the April 1, 2010, deadline.

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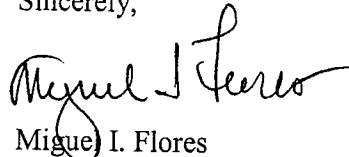
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EPA also greatly appreciates ODEQ's efforts to submit water quality assessment results in a standard electronic format. This enables EPA to automate some aspects of the review and evaluate the information more efficiently. Further, this significantly reduces the time, effort, and cost required for EPA to compile the data with those submitted by other States, Territories, and Tribes when preparing the National Water Quality Inventory Report to Congress.

Thank you again for your efforts in developing Oklahoma's 2008 section 303(d) list and for your cooperation in addressing EPA's questions. We are sincerely grateful for your help in streamlining the section 303(d) list review process. If you have questions, please contact me at (214) 665-7101 or Charlie Howell at (214) 665-8354.

Sincerely,

A handwritten signature in black ink, appearing to read "Miguel I. Flores". The signature is fluid and cursive, with the first name "Miguel" being more prominent.

Miguel I. Flores
Director

Water Quality Protection Division

cc: Mark Derischweiler, Oklahoma Department of Environmental Quality
Derek Smithee, Oklahoma Water Resources Board

Enclosure

DECISION DOCUMENT FOR FINAL EPA ACTION ON OKLAHOMA 2008 SECTION 303(d) LIST

Enclosure to letter from Miguel I. Flores, EPA Region 6, to Jon L. Craig, Oklahoma Department of Environmental Quality

Purpose

The purpose of this document is to describe the rationale for EPA's approval of the Oklahoma 2008 section 303(d) list of water quality limited segments still requiring Total Maximum Daily Loads (TMDLs). The following sections identify those key elements to be included in the list submission based on the Clean Water Act (CWA) and EPA's implementing regulations found at 40 CFR section 130.7. EPA reviewed the methodology used by the State in developing the section 303(d) list and the State's description of the data and information considered. EPA's review of Oklahoma's section 303(d) list is based on whether the State reasonably considered all existing and readily available water quality-related data and information, and reasonably identified waters that should be listed.

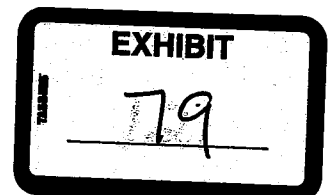
Key Dates

1. State transmittal letter for the final Oklahoma 2008 Water Quality Assessment Integrated Report: September 16, 2008
Receipt by EPA: September 19, 2008
2. Submittal of Integrated Report geographic information system (GIS) data layers, and assessment database (ADB) in standard extensible markup language format (via ODEQ e-mail message attachment sent by Joe Long): September 16, 2008

Statutory and Regulatory Background**Identification of Water Quality Limited Segments for Inclusion on the Section 303(d) List**

Section 303(d)(1) of the Act and 40 CFR section 130.7(b) direct each state to identify those waters within its jurisdiction for which effluent limitations required by section 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard, and to establish a priority ranking for such waters, taking into account the severity of the pollution and the uses of such waters. Section 303(d)(2) of the Act and 40 CFR section 130.7(d) require the states to submit their section 303(d) lists to EPA for approval. The section 303(d) listing requirements apply to waters impaired by point and/or nonpoint sources, pursuant to EPA's long-standing interpretation of section 303(d).

EPA regulations provide that states do not need to list waters where the following controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the Act, (2) more stringent effluent limitations required by state or



DECISION DOCUMENT FOR EPA ACTION ON OKLAHOMA 2008 SECTION 303(D) LIST

local authority, and (3) other pollution control requirements required by state, local, or federal authority. See 40 CFR 130.7(b)(1).

Consideration of Existing and Readily Available Water Quality-Related Data and Information

In developing section 303(d) lists, the states are required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as partially meeting or not meeting designated uses, or as threatened, in the state's most recent section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate non-attainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions, in response to active solicitation by the state for information about research they may be conducting or reporting; and (4) waters identified as impaired or threatened in any section 319 nonpoint assessment submitted to EPA. See 40 CFR 130.7(b)(5). In addition, states are required to consider any other existing and readily available data and information. See "Guidance for Water Quality-Based Decisions: The TMDL [Total Maximum Daily Load] Process," EPA Office of Water, 1991, Appendix C ("EPA's 1991 Guidance"). While the states are required to evaluate all existing and readily available water quality-related data and information, the states may decide to rely or not rely on particular data or information in determining whether to list particular waters.

In addition to requiring the states to assemble and evaluate all existing and readily available water quality-related data and information, EPA regulations at 40 CFR 130.7(b)(6) require the states to include, as part of their submissions to EPA, documentation to support decisions to rely or not rely on particular data and information for decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and information used to identify waters; (3) a rationale for any decision to not use any existing and readily available data and information; and (4) any other reasonable information requested by the Region.

Priority Ranking

EPA regulations also codify and interpret the requirement in section 303(d)(1)(A) of the Act that the states establish a priority ranking for the listed waters. The regulations at 40 CFR 130.7(b)(4) require the states to prioritize waters on their section 303(d) lists for TMDL development, and also to identify those water quality limited segments (WQLSs) targeted for TMDL development in the next two years. 40 CFR section 130.7(b)(4) also requires the state to identify the pollutants causing or expected to cause violations of applicable water quality standards. In prioritizing and targeting waters, the states must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters. See section 303(d)(1)(A). The states may consider other factors relevant to prioritizing waters for TMDL development, including immediate

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programmatic needs, vulnerability of particular waters as aquatic habitats; recreational, economic, and aesthetic importance of particular waters; degree of public interest and support; and the state or national policies and priorities. See 57 FR 33040, 33045 (July 24, 1992), and EPA's 1991 Guidance.

Analysis of Oklahoma's Submission

Consideration of Existing and Readily Available Water Quality-Related Data and Information.

EPA has reviewed the State of Oklahoma's 2008 submission and concluded that the State developed the section 303(d) list in compliance with section 303(d) of the Act and 40 CFR 130.7. EPA analyzed the documentation provided by Oklahoma in support of listing decisions to determine whether the State reasonably considered existing and readily available water quality-related data and information and reasonably identified waters to be listed. EPA's decision to approve Oklahoma's listing decisions is based on EPA's review of the data and information submitted concerning individual waters and the State's evaluations of those waters.

Oklahoma combined the 2008 section 305(b) report and section 303(d) list into a single report following EPA guidance entitled "Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions". See also 40 CFR section 130.7(d)(1). A single water quality assessment methodology was followed for both the 305(b) report and the 303(d) list. Oklahoma's Integrated Report included five categories as established in EPA's guidance, including Category 5 which constitutes the 2008 section 303(d) list. Category 5 is the only portion of Oklahoma's Integrated Report on which EPA is taking action today.

EPA reviewed Oklahoma's assessment and listing methodology, described in Oklahoma Administrative Code 785:46, Implementation of Oklahoma's Water Quality Standards Use Support Assessment Protocols, as part of the review of the listing submission. However, CWA section 303(d) and 40 CFR section 130.7 do not require EPA to take action on a state's listing methodology. Therefore, EPA's approval of the State's listing decisions should not be construed as concurrence with or approval of the listing methodology.

Oklahoma's 2008 Integrated Report includes water quality data, assessment results and information collected and compiled by multiple state agencies, in addition to federal and local agencies and volunteer water monitoring groups. The report includes information that indicates that standards attainment decisions were made based on assessment of water quality-related data.

Oklahoma's 2008 section 303(d) list now includes 743 waterbody segments and 1,758 segment-pollutant combinations. The 2008 list reflects a net increase in numbers of segments when compared to the 2006 list, attributable to Oklahoma's ongoing efforts to

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expand their water quality monitoring programs and apply new assessment methods, leading to documentation of previously unidentified water quality problems.

Three hundred thirty-nine segments that were listed in 2006 were removed from the 2008 list, for reasons that were consistent with EPA guidance. The general reasons for removing waters from the list were included in the ADB submission, and additional details were provided in the final Integrated Report. The following are the general reasons cited for removal of waterbodies from the section 303(d) list:

- TMDLs were completed for pollutants included on previous section 303(d) lists.
- Recent data collected from a 303(d) listed segment indicated that a listed pollutant is no longer a potential cause of water quality impairment.
- Changes in the applicable water quality standards and/or assessment methods resulted in changes in the standards attainment status of previously listed segments.
- The state review identified flaws in original listings, attributable to errors associated with segment identifiers, or assessments that were based on numeric criteria that were not part of the applicable standards.
- New segment boundaries changed the identification of a segment-pollutant combination, and/or the geographic area affected by a section 303(d) listing.

EPA concludes that the State properly assembled and considered all existing and readily available data and information, including all of the existing and readily available data and information relating to the categories of waters specified in 40 CFR 130.7(b)(5). EPA also concludes that the State's decisions to list the waters identified in its listing submission are consistent with federal listing requirements.

Public Participation

EPA has determined that the State of Oklahoma took reasonable steps to solicit all existing and readily available water quality-related data and information from members of the public and government agencies via public participation when preparing Oklahoma's 2008 Integrated Report, consistent with 40 CFR section 130.7(b)(5)(iii).

The public participation process included solicitations for input from the public via direct mailings in September 2007, as described in the Integrated Report. Several interagency meetings were held to review the assessment methodology and draft list, including priority ranking and scheduling for 303(d) listed waters. The draft list was also sent to EPA and made available for public review.

Oklahoma's 2008 Integrated Report includes a responsiveness summary that explains how the State considered public comments in the final listing decisions. The

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public review helped to identify errors associated with five pollutant listings that were subsequently corrected by the State, prior to the final submittal to EPA. Other listing issues were also identified during the public review that were subsequently considered by the State; however, no changes were made to the section 303(d) list. The State addressed these comments by (1) providing additional information to clarify the State's position, (2) agreeing to consider new data and information during development of the 2010 list, and (3) forwarding the information to other Oklahoma agencies for appropriate follow-up actions. The State's responses to public comments appeared to be reasonable and consistent with existing EPA guidance.

Priority Ranking and Targeting

EPA also reviewed the State's priority ranking of listed waters for TMDL development and concludes that the State properly took into account the severity of pollution and the uses of listed waters. The State documented the use of a comprehensive methodology in the Integrated Report for prioritizing waters for TMDL development. The level of priority for each waterbody is expressed in the report by the targeted date for development. As such, the State identified 126 segments targeted for TMDL development between 2008 and 2010. EPA concludes that the State's priority ranking and targeting commitments are consistent with federal requirements.

Administrative Record Supporting This Action

In support of this decision to approve the State's listing decisions, EPA carefully reviewed the materials submitted by the State with its 303(d) listing decision. The administrative record supporting EPA's decision is comprised of the materials submitted by the State, copies of section 303(d), associated federal regulations, and EPA guidance concerning preparation of section 303(d) lists, as well as this decision letter (see Appendix). EPA has determined that the materials provided by the State with its submission provide sufficient documentation to support our analysis and findings that the State listing decisions meet the requirements of the CWA and 40 CFR 130.7. We are aware that the State compiled and considered additional materials (e.g., raw data and water quality analysis reports) as part of its list development process that were not included in the submission. EPA did not consider these additional materials as part of its review of the listing submission. Neither the CWA nor 40 CFR 130.7 require the State to submit to EPA all data and information assembled as a result of its 303(d) list development process, and it is unnecessary for EPA to review all of the background materials in order to determine that the State complied with the applicable federal listing requirements.

Consideration of Waters within Indian Country

EPA's approval of Oklahoma's section 303(d) list extends to all water bodies on the list with the exception of those waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. EPA is taking no action to approve or disapprove the State's list

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with respect to those waters at this time. EPA, or eligible Indian Tribes, as appropriate, will retain responsibilities under Section 303(d) for those waters.

Statewide Schedule for TMDL Development

The Integrated Report also included ODEQ's long-term schedule for TMDL development for all waters on the 2008 list. EPA acknowledges and appreciates receipt of this schedule.

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Appendix: List of administrative records used in review of the Oklahoma 2008 §303(d) List

1. Water Quality in Oklahoma: 2008 Integrated Report Prepared Pursuant to Section 303(d) and Section 305(b) of the Clean Water Act, Oklahoma Department of Environmental Quality.
2. Assessment Database (ADB) files and geographic information system (GIS) data layers, supporting the State of Oklahoma 2008 Integrated Report, submitted by the Oklahoma Department of Environmental Quality on September 16, 2008
3. Title 785. Oklahoma Water Resources Board -- Chapter 45. Oklahoma's Water Quality Standards, April 23, 2008.
<http://www.owrb.ok.gov/quality/standards/standards.php>
4. Title 785. Oklahoma Water Resources Board -- Chapter 46. Implementation of Oklahoma's Water Quality Standards Board, April 23, 2008.
5. EPA, October 12, 2006 memorandum from Diane Regas, Director, Assessment and Watershed Protection Division, Office of Water, EPA headquarters to Regions 1-10 Water Division Directors; Robert Maxwell, Director, Office of Environmental Measurement and Evaluation Region 1, Barbara Finazzo, Director, Division of Environmental Science and Assessment Region 2, Gale Hutton, Director, Environmental Services Division, Region 7 and Bill Riley, Director, Office of Environmental Assessment, Region 10 regarding "*Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions*", http://www.epa.gov/owow/tmdl/2008_ir_memorandum.html
6. EPA, 2005, *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act*, EPA Office of Water, July 29, 2005.
7. EPA, 2003, *Guidance for 2004 Assessment, listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act* EPA: TMDL-01-03 U.S. Environmental Protection Agency, Office of Water, Washington, DC.
8. EPA 2002, *Consolidated Assessment and Listing Methodology*, EPA Office of Water, July 2002.
9. EPA 2000, April 28, 2000 memorandum from Robert H. Wayland, III, Director, Office of Wetlands, Oceans, and Watershed, office of Water, EPA Headquarters regarding "EPA Review of 200 Section 303(d) Lists."
10. EPA 2001b, November 19, 2001 memorandum from EPA Office of Water regarding *2002 Integrated Water Quality monitoring and Assessment Report Guidance*.

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11. EPA 1997a, May 23, 1997 memorandum from Geoffrey H. Grubbs, Director, Assessment and Watershed Protection Division, Office of Water, EPA headquarters to FACA Workgroup Section 303(d) Listing Criteria re: Nonpoint Sources and Section 303(d) Listing Requirements.
12. EPA 1997a, August 27, 1997 memorandum from Robert H. Wayland III, Director, Office Wetlands, oceans, and Watershed, Office of Water, EPA Headquarters, to Water Division Directors, Regions I-X, and Directors, Great Water Body program, and Water Quality Branch chiefs, Regions I-X, regarding "National Clarifying Guidance for 1998 State and Territory Section 303(d) Listing Decisions."
13. EPA 1997b, September, 1997 Guidance from Office of Water, Headquarters, UA EPA regarding *Guidelines for preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Supplement*, EPA-841-B-97-002B.
14. EPA 1996, August 9, 1996 memorandum from Robert Perciasepe, Assistant Administrator regarding EPA Action on 1996 lists, "Priority Rankings and TMDL Targeting Plans Submitted by States Under Section 303(d) of the CWA."
15. EPA 1993, November 26, 1993 memorandum from Geoffrey Grubbs, Director, Assessment and Watershed Protection Division, Office of Water, EPA headquarters, to Water Quality Branch Chiefs, Regions I-X, and TMDL coordinators, Regions I-X, regarding "Guidance for 1994 Section 303(d) Lists."
16. EPA 1992a, July 24, 1992 Federal Register Notice, *40 CFR Parts 122, 123, 130*, revision of regulation, 57 Fed. Reg. 33040.
17. EPA 1992b, August 13, 1992 memorandum from Geoffrey Grubbs, Director, Assessment and Watershed Protection Division, office of Water, EPA Headquarters, to EPA Water Quality Branch Chief's, Regions I-X and TMDL Coordinators, Regions I-X, regarding "Supplemental Guidance on Section 303(d) Implementation."
18. EOA 1992c, October 30, 1992 memorandum from Geoffrey Grubbs, Director, Assessment and Watershed Protection Division, Office of Water, EPA Headquarters, to Water Quality Branch Chiefs, Regions I-X, regarding "Approval of 303(d) Lists, Promulgation Schedules/Procedures, Public Participation."
19. EPA 1991, April 1991. *Guidance for Water Quality Based Decisions: The TMDL Process*, App. C. EPA 440/4-91-001 U.S. Environmental protection Agency, Office of Water, Washington, DC.
20. EPA 1985, January 11, 1985 Federal Register Notice, *40 CFR Parts 35 and 130*, Water Quality Planning and Management: Final Rule, 50 Fed. Reg. 1774

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21. EPA 1978, December 28, 1978 Federal Register Notice, Total Maximum Daily Loads Under Clean Water Act, finalizing EPA's identification of pollutants suitable for TMDL calculations, 43 Fed. Reg. 60662.

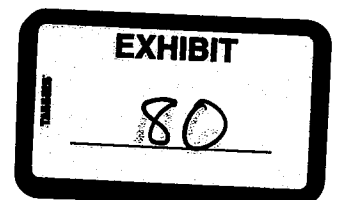
**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA**

STATE OF OKLAHOMA,)	
)	
Plaintiff,)	
)	
v.)	Case No. 05-cv-329-GKF(PJC)
)	
TYSON FOODS, INC., et al.,)	
)	
Defendants.)	

DECLARATION OF ROGER L. OLSEN, Ph.D.

I, Roger L. Olsen, Ph.D., hereby declare as follows:

1. Since February 1985, I have been an employee of Camp Dresser & McKee Inc. ("CDM"), an environmental consulting firm. I currently hold the position of Senior Vice President and Senior Geochemist with CDM. My educational background includes a Bachelor of Science degree with high distinction in Mineral Engineering Chemistry from the Colorado School of Mines, Golden, Colorado in 1972 and a Doctor of Philosophy degree in Geochemistry from the Colorado School of Mines in 1979.
2. From 1975 to 1978, I was an instructor in chemistry and geochemistry at the Colorado School of Mines. I taught courses in general chemistry and quantitative analysis. From 1978 to 1979, I was a senior research chemist with Rockwell International at the Rocky Flats plant. I was responsible for evaluating methods to clean up contaminated soil at Rocky Flats and other Department of Defense facilities. From 1979 to 1983, I was a project supervisor with D'Appolonia Consulting Engineers. In 1983, International Technology (IT) acquired the portion of D'Appolonia for which I worked. At D'Appolonia and IT, I performed many evaluations related to environmental contamination. In 1985, I joined CDM where I continued to evaluate environmental



contamination. I have extensive experience in performing environmental investigations and studies, evaluating the environmental fate and transport of chemicals in the environment and determining the cause or source of contamination in the environment. In all, I have worked on or evaluated environmental conditions at over 500 sites. I am the author or coauthor of over 120 publications/presentations and over 400 technical reports relating to environmental contamination.

3. In November 2004, CDM was retained by the Oklahoma Attorney General to perform an investigation concerning environmental contamination found in the Illinois River Watershed ("IRW"). I have been CDM's project technical director since inception of the project. In this capacity, I have helped plan and direct a systematic investigation of the environmental contamination found in the IRW. This investigation included collection and laboratory analyses of poultry waste, soils, surface waters, groundwaters and sediments throughout the IRW.

4. On May 14, 2008, I submitted an Expert Report to the Defendants in the above-captioned litigation. This Expert Report contains statements, findings, analysis and opinions related to the work CDM's investigation of the IRW. Also included in the Expert Report is a detailed description of the various lines of evidence which tend to prove that land applied poultry is the dominant source of contamination in the IRW.

5. The following statements and opinions are taken directly from my Expert Report, pp. 6-66 – 6-67:

"[M]ultiple lines of evidence were used to evaluate the sources of contamination in the IRW. The multiple lines of evidence all support that poultry waste disposal by land application is a major source of contamination including phosphorus and bacteria in the IRW. These lines of evidence include the chemical and bacterial composition of major waste sources compared to contamination in the IRW, mass balance calculations showing that poultry waste is a major source of

contamination, fate and transport observations for poultry waste contaminants through out the IRW, analyses and detection of a poultry specific biomarker and PCA evaluations showing poultry waste contamination in [is] [corrected in July 25, 2008, Errata, pg 6] a dominant source. These lines of evidence can be used to test the hypotheses stated.... The conclusions concerning the hypotheses follow:

- Land application of poultry waste affects the chemical and bacterial water and sediment composition of the IRW and the affect is observable in surface water, groundwater and sediments collected from the IRW. Poultry waste is the dominant source of contamination in the IRW.
- WWTP discharges into rivers affect the chemical and bacterial water composition of the IRW. The affect is observable in surface waters collected from the IRW. The effect is not as large as the effect of poultry waste disposal in the IRW.
- Cattle manure deposited in fields and rivers affects the chemical and bacterial composition; however, no dominant impact is observed from cattle waste in the PCA.”

6. Figures 6.5-2, 6.5-4, 6.5-6 and 6.5-8 of my Expert Report provide a summary of the concentrations of total phosphorus, soluble reactive phosphorus, enterococci and total organic carbon in various environmental components throughout the IRW (edge field samples, small tributary samples, larger river samples, Lake Tenkiller samples, and reference samples). The edge of field samples have very elevated concentrations of these parameters and by far have the highest concentrations of any of the other environmental components.

7. Appendix D, Table 1, Summary of Poultry Waste FAC Samples in my Expert Report provides a summary of the chemical and bacterial composition of poultry waste samples collected in the IRW. Total Phosphorus concentrations ranged from 10,114 to 30,559 mg/kg with an average concentration of 20,056 mg/kg,

I declare under penalty of perjury, under the laws of the United States of America, that the foregoing is true and correct.

Executed on the 15th day of May, 2009.

Roger L. Olsen

Roger L. Olsen, Ph.D.

1 IN THE UNITED STATES DISTRICT COURT
 2 FOR THE NORTHERN DISTRICT OF OKLAHOMA

3 STATE OF OKLAHOMA, ex rel,
 4 W.A. DREW EDMONDSON, in his
 capacity as ATTORNEY GENERAL
 5 OF THE STATE OF OKLAHOMA,
 et al.

6 Plaintiffs,

7 V.

8 TYSON FOODS, INC., et al.,

9 Defendants.
 10
 11
 12

No. 05-CV-329-GKF-SAJ

13 REPORTER'S TRANSCRIPT OF PROCEEDINGS

14 FEBRUARY 21, 2008

15 PRELIMINARY INJUNCTION HEARING

16 VOLUME III

17
 18 BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge
 19

20 APPEARANCES:

21 For the Plaintiffs: Mr. Drew Edmondson
 Attorney General
 22 Mr. Robert Nance
 Mr. Daniel Lennington
 23 Ms. Kelly Hunter Burch
 Mr. Trevor Hammons
 24 Assistant Attorneys General
 313 N.E. 21st Street
 25 Oklahoma City, Oklahoma 73105

Glen R. Dorrough
 UNITED STATES COURT REPORTER

EXHIBIT

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15 PROCEEDINGS

16 February 21, 2008

17 THE COURT: Mr. Bullock, Mr. George, and Ms.
 18 Southerland and I spoke a second ago outside the courtroom with
 19 regard to evidentiary matters. We've been going at such a
 20 rapid pace and because there has been an agreement with regard
 21 to exhibits on direct, there have been promises made to the
 22 Court with respect to exhibits that have been used on cross
 23 that they would be handled at the next break or at lunch that
 24 has not been done. So the concern is that going forward, we
 25 need to handle this matter very quickly or it presents real

1 percentages found in the different environmental components.

2 A. We found the poultry waste contamination in 60 percent of
3 all the groundwater samples and 73 percent of all the surface
4 water samples. And looking at all those water samples
5 together, that would be 73 percent total.

6 Q. Now, Dr. Olsen, have you also examined the surface water
7 samples that contain bacteria in excess of the primary body
8 contact recreation standards?

9 A. Yes, I have.

10 Q. Have you looked at that in relationship to the poultry
11 waste signature you've identified?

12 A. Yes, I have.

13 Q. What did you find?

14 A. I found in those samples which had exceedances of the
15 state standards and for which I had enough analysis that I
16 could create a PCA score, that 84 percent of those samples that
17 have exceedances had poultry waste.

18 Q. So the exceedances that we showed on the board or the map,
19 excuse me, 84 percent of the surface water samples had the
20 poultry waste signature?

21 A. Just those samples that I had that extensive list of
22 chemical contaminants that I could create a score, 84 percent
23 of those samples had poultry waste in them.

24 Q. Okay. And what does this mean in practical terms?

25 A. It means that practically whenever we had an exceedance,

1 the vast majority of those had poultry waste.

2 Q. And did you do a similar analysis for groundwater?

3 A. Yes, I did.

4 Q. And what did you find?

5 A. Again, for those samples of groundwaters that had bacteria
6 and for which I had enough parameters to do the PCA evaluation,
7 67 percent of those samples had poultry waste in them.

8 Q. Again, what does that mean in plain terms?

9 A. It means that over two-thirds of those samples that had
10 exceedances that I could evaluate had poultry waste
11 contamination.

12 Q. Now, very briefly, Dr. Olsen, I want to finally look at
13 Plaintiffs' Exhibit 454. And while you're getting that, I want
14 to ask you a question. After you had your deposition taken in
15 this case, did you discover that your statistical analysis was
16 run with rejected data?

17 A. Yes, I just was doing some checking and of the actual
18 results and looking at individual scores and individual
19 contaminants, I noticed that there was some rejected data in
20 the evaluations.

21 Q. How did that happen?

22 A. It wasn't in the data. It was in the database flagged
23 right that we used, but we forgot to carry over those flags
24 when we created subsets of data to do the PCA analysis on.

25 Q. So there was a problem with the query of the computer?

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex rel.)
W.A. DREW EDMONDSON, in his)
capacity as ATTORNEY GENERAL OF)
THE STATE OF OKLAHOMA and)
OKLAHOMA SECRETARY OF THE)
ENVIRONMENT C. MILES TOLBERT,)
in his capacity as the TRUSTEE FOR)
NATURAL RESOURCES FOR THE)
STATE OF OKLAHOMA)

Plaintiff,)

vs.)

Case No. 4:05-cv-00329-GKF-PJC

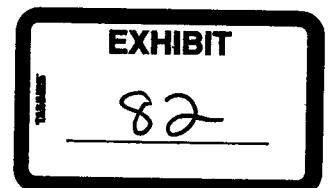
TYSON FOODS, TYSON POULTRY,)
INC., TYSON CHICKEN, INC., COBB-)
VANTRESS, INC., AVIAGEN, INC.,)
CAL-MAINE FOODS, INC., CAL-)
MAINE FARMS, INC., CARGILL, INC.,)
CARGILL TURKEY PRODUCTS, LLC,)
GEORGE'S, INC., GEORGE'S FARMS,)
INC., PETERSON FARMS, INC.,)
SIMMONS FOODS, INC., AND)
WILLOWBROOK FOODS, INC.)

Defendants.

AFFIDAVIT OF DR. CHRISTOPHER M. TEAF

The undersigned, Christopher M. Teaf, does hereby declare:

1. I received a Bachelor's degree in Biology (with Honors) from Pennsylvania State University and a Master's degree in Biological Science from Florida State University. I earned my Ph.D. in Toxicology from the University of Arkansas for Medical Sciences



(Little Rock, Arkansas) and conducted my research at the Division of Genetic Toxicology, National Center for Toxicological Research (Jefferson, Arkansas).

2. I presently hold positions as Associate Director at the Center for Biomedical & Toxicological Research and Waste Management at Florida State University (since 1983), as well as Director of Toxicology for the research firm of Hazardous Substance & Waste Management Research, Inc. since 1985 (President since 1989). I have held adjunct teaching appointments at the Florida State University / State University System Program in Medical Sciences, Florida A & M University College of Pharmacy and Pharmaceutical Sciences, and University of Arkansas for Medical Sciences.

3. I am board certified as a Fellow by the Academy of Toxicological Sciences.

4. My research and scientific advisory activities principally are in the areas of toxicology and health risk assessment for human exposure to occupational and/or environmental chemical and biological hazards.

5. For over 25 years, I have directed and conducted research projects and human health education activities for many agencies such as the World Health Organization (WHO), the North Atlantic Treaty Organization (NATO), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy (DOE), the U.S. Department of Agriculture (USDA), the federal Agency for Toxic Substances and Disease Registry (ATSDR), the Florida Department of Environmental Protection (FDEP), the Florida Department of Health (FDOH), the Florida Department of Community Affairs (FDCA), and many local governmental entities. These activities have been conducted in the United States, as well as Eastern Europe (e.g., Bulgaria, Czech Republic, Hungary, Poland), in Central Asia (e.g., Kazakhstan), and in Russia.

6. I have served as a peer reviewer for publications submitted to numerous scientific journals and presently serve on the editorial boards for several of these scientific journals. I am Senior Human Health Editor for the international journal *Human & Ecological Risk Assessment*. I have published many scientific papers, articles and book chapters concerning toxicological effects and risk evaluations related to occupational and environmental exposures and effects.

7. The scientific literature is clear in demonstrating that, despite what may be considered to be somewhat hostile conditions, bacteria can survive sufficiently well in the environment under a wide variety of circumstances to be moved, to persist, and to represent sources of human infection (e.g., Giddens and Barnett, 1980; Crane et al., 1980; Adamski, 1987; Adamski and Steele, 1988; Coyne and Blevins, 1995; Hartel et al., 2000; Gagliardi and Karns, 2000; Jamieson et. al., 2002; Tetra Tech, 2004; Davis et al. 2005; Ringbauer et al., 2006; PCIFAP, 2008.)

8. Land spreading of poultry waste has long been recognized as a major bacterial contamination source (Crane et al., 1980; Adamski, 1987; Adamski and Steele, 1988; PCIFAP, 2008). Spreading of waste material, a traditional agricultural waste disposal practice, becomes a major source of contamination because frequently it exceeds the rate at which wastes can be accommodated by or processed in agricultural ecosystems (Coyne and Blevins, 1995). Rainfall, specifically when it occurs shortly after land spreading, may then result in pathogen distribution by runoff from spread poultry waste or by leaching through the soil profile (Giddens and Barnett, 1980; Gagliardi and Karns, 2000; Fisher, 2008; Olsen, 2008), even if buffer zones are used correctly, which they frequently are not. This is rendered even more important by the fact that the recreational season for the Illinois River Watershed (IRW) overlaps with and immediately follows the rainy season, a period which is well within the survivability duration of the bacteria in question. The environmental survivability of bacteria can be on the order of several days to many months (Jamieson et. al., 2002; Tetra Tech, 2004; Davis et al. 2005). Runoff from waste-spread fields carries excess nutrients, pollutants, and pathogens to nearby waterways, which negatively affects surface water, groundwater, aquatic life, and human health; even months after land application of waste, fecal coliforms and *E. coli* can be resuspended from sediments and transported downstream (Coyne and Blevins, 1995; Hartel et al., 2000; Davis et al., 2005; Ringbauer et al., 2006).

9. The microbial condition of waterbodies in other parts of Oklahoma, or of other states, is not relevant to the health risks posed by conditions in the IRW. Whatever the source of bacteria elsewhere, a major contribution in the IRW is from land application of

poultry waste. An analysis of potential sources for fecal coliforms was conducted in a fashion consistent with that employed by USEPA and ODEQ for the six counties which share some portion of the Illinois River Watershed (Adair, Cherokee, Delaware and Sequoyah in OK; Benton, Washington in AR). That analysis considered fecal coliform contributions by a variety of categories for which data were available, including: domestic pets, deer/wildlife, failing septic systems, permitted point sources (i.e., NPDES outfalls), and livestock. The livestock category was further subdivided into groups by poultry, cattle/calves, horses/ponies, sheep/lambs, and swine. The aggregate fecal coliform load from poultry and from cattle/calves is approximately 5×10^{15} CFU/day, or 5,000,000,000,000,000 CFU/day each.

Several important conclusions can be drawn from this source contribution analysis, including the following:

- The categories of domestic pets, deer/wildlife, failing septic systems and point sources each contribute from 0.01% to 0.9% of total fecal coliform loading. Those contributions are not significant in comparison to the contribution from livestock;
- The livestock category alone contributes nearly 99% of total fecal coliform loading;
- Within the livestock category, poultry and cattle/calves each contribute just over 40% each of the total, swine contribute about 14% of the total, sheep/lambs contribute about 0.1% of the total, and horses/ponies contribute about 0.03% of total fecal coliform loading.

The leachability of poultry waste was on the order of 1 to 5 times greater than fresh cattle manure, and is likely to be even greater for dry manure based on the smaller particle sizes present in poultry waste (Olsen, 2008). Therefore, poultry waste is much more likely to leach components with the potential for adverse impacts from the site of application to nearby water sources, than is cattle manure.

10. Bacteria of human health significance, including *Campylobacter*, *Salmonella*, *Staphylococcus*, *Escherichia coli* and other important species, as well as bacterial "indicator organisms" such as fecal coliforms and enterococci, are present in poultry waste (e.g., Kelley et al., 1995; Jenkins et al., 2006; CDM, 2008; PCIFAP, 2008). The presence of microbial indicator organisms in surface and groundwater bodies globally

is used as evidence that other potentially dangerous bacteria such as *Campylobacter*, *Salmonella* and/or *Staphylococcus* also may be present, in addition to ancillary viruses and protozoa that are more difficult to monitor (e.g., *Cryptosporidium*). This assumption is considered to be relevant whether or not other analytical tests are conducted for those organisms.

11. The process of evaluating bacterial water quality according to the construct of “indicator organisms” is an accepted, well-established and long-running process that is employed by nearly all states and by many countries around the world. The U.S. EPA 303(d) List is prepared on a biennial basis as an ongoing obligation under the 1972 amendments to the Clean Water Act. It requires states to compile a list of water bodies that are “impaired” for various parameters, and to submit updated lists of the impaired water bodies to the U.S. EPA biennially (ODEQ, 2006; ODEQ, 2008). The U.S. EPA 303(d) list defines an “impaired” water body as one which does not meet state water quality standards, in this case applicable standards are those related to Primary Body Contact Recreation with surface water. The presence and magnitude of microbial indicator organisms, as used for impairment determinations, are commonly and widely accepted measures of the potential for presence and health significance of pathogens, including bacteria, viruses and protozoa (Toranzos et al., 2002; WHO, 2003; NRC, 2004; USEPA, 2005; Wade et al., 2006).

Contamination of surface water and groundwater supplies by bacteria has long been recognized as a human health concern in the United States and around the world. The 1986 U.S. EPA *Ambient Water Quality Criteria for Bacteria* provided historical context and recommendations concerning appropriate guidelines for microorganisms (USEPA, 1986). Subsequent refinements and updates to that guidance are represented by the *Implementation Guidance for Ambient Water Quality Criteria for Bacteria* (USEPA, 2003; USEPA, 2004). This health-based guidance fits into the operable “fishable/swimmable” goals of the Clean Water Act, which specifically requires water quality standards must “protect the public health and welfare, enhance the quality of water, and serve the purposes of this Act.” Microbiological contamination of water can be caused by bacteria, viruses, protozoa and other related organisms. The number and diversity of these potential contaminants has resulted in the development of practical assessment

and protection strategies which employ "indicator organisms" as surrogates for quantification of specific species in water bodies (Barrell et al., 2000; USEPA, 2003; National Research Council, 2004; USEPA, 2004). These indicator organisms, such as *Escherichia coli* (*E. coli*), enterococci, and fecal coliform bacteria, may not cause illness directly, but they have demonstrated characteristics which make them reliable indicators of other harmful pathogens in water (Wade et al., 2006). Although the most commonly reported illnesses associated with bathing in contaminated water typically are gastrointestinal in nature, other illnesses and conditions affecting the eyes, ears, skin and upper respiratory tract can occur as well. Essentially all local, state, and national health agencies employ one or more of the indicator organisms in their water quality management programs, and this is true internationally as well (WHO, 2000; USEPA, 2003; USEPA, 2004). Thus, there is consensus that the presence of these indicator organisms at levels greater than the health-based criteria or standards represents a human health threat.

The 2004 U.S. EPA *Implementation Guidance*, cited previously, provides detailed information regarding the basis for the environmental and health agency recommendations, including discussions on the epidemiology of microbiological disease related to water uses such as swimming, kayaking, water skiing, and other activities where direct contact and immersion in the water are likely. For *E. coli*, a geometric mean density of 126 organisms per 100 milliliters (ml) of water over a 30-day period was associated with an illness rate of 0.8%, or 8 illnesses per 1,000 recreational users (0.8%). As a short-term measure, this 0.8% illness rate was associated with bacterial counts of 236 per 100 ml as an upper limit. For the enterococci, a geometric mean of 33 organisms per 100 ml and an upper limit of 62 organisms per 100 ml were associated with the 0.8% illness rate (OAC, 2007). Above these threshold levels, the agency noted that illness rates rise sharply, and the health-based recommendation seeks to remain below that part of the statistical curve. The State of Oklahoma, along with essentially all other states, has adopted these or similar indicator organism criteria as a fundamental element of their water quality criteria for protection of human health. There is nothing unusual or unique about the State of Oklahoma approach.

12. While U.S. EPA has on occasion organized workshops and convened scientific meetings to discuss the issue of bacterial water quality and the use of various methods to assess such water quality (e.g., USEPA, 2007), those organizations and work groups have yielded only suggestions and potential alternatives. Multiple deadlines in the past have been proposed, not met, and re-proposed, for developing tangible revisions to the bacterial water quality criteria and assessment methods. This pattern clearly illustrates the difficulty and controversy associated with attempting to replace the existing system. To date, no viable alternative has been agreed upon or implemented, and the existing system remains in place both at the federal and state levels.

13. The Oklahoma State Department of Health (OSDH) maintains statistics regarding specific reportable diseases including diseases caused by bacteria such as *Campylobacter*, *Salmonella*, and *E. coli* 0157:H7, and by other microscopic parasites such as *Giardia* and *Cryptosporidium*. These organisms have been associated with poultry waste and often are also associated with contaminated drinking water, fecal material, and contact with birds. An evaluation of OSDH records for Oklahoma counties in the IRW shows that Adair County reported rates of campylobacteriosis considerably in excess of the state average for the period 1997 to 2005 (OSDH, 2006). Adair County makes up the largest portion of land area within the IRW. In addition, rates of salmonellosis reported between 1990-2005 also have periodically exceeded the average statewide incidence rate. The rate of salmonellosis in Sequoyah County was reported to exceed the state rate for all except three years during the period 1990 to 2001 (OSDH, 2006; OSDH, 2007). Furthermore, the data from the OSDH shows no associations between serotypes of the *Salmonella* bacterium. In addition to the lack of commonality between serotypes, no common relationships between individuals, demographic characteristics, or locations were identified, as would be expected from a single, large food-borne outbreak (OSDH, 2006).

14. Notwithstanding the statistics maintained by the OSDH, identification of individual illnesses is not a prerequisite to positing a reasonable likelihood of human health risk from bacterial contamination in the IRW. While the OSDH has not investigated any "outbreaks" with regard to the diseases discussed above, it cannot and

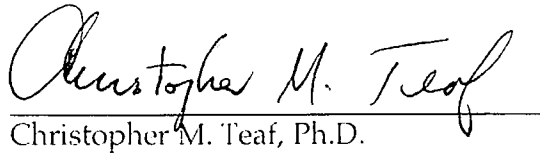
should not be presumed that incidents of infection are not occurring. Without question, tourism within the watershed is extensive, considering for example, that the general population of Adair County during the period 1990 to 2000 ranged from about 19,000 to 21,000 people (U.S. Census, 1990; U.S. Census, 2000) and at least an estimated 155,000 people use the IRW annually (Caneday, 2008). When using the CDC's guidelines for investigating an outbreak, a clustering of sickness must take place to warrant an investigation. This, therefore, would be very difficult to achieve under recreational use circumstances, recognizing that many tourists visit the Illinois River watershed from Arkansas, Kansas, Missouri, as well as other counties in Oklahoma. Lee et al. (2002) correctly noted that outbreak investigations were increasingly difficult to document when users convene onto one venue and then geographically disperse. This illustrates one possible reason why no focused investigations have been initiated for the IRW. Latency periods on the order of a day to a week (Mayo Clinic, 2008; CDC, 2008), depending on the bacterium, would surely affect reporting statistics if recreational users and tourists to the region are taken into account, and consideration is given to the likelihood of returning to their homes after visiting the IRW. Additionally, outbreaks associated with some infective organisms are less likely to be investigated than acute diseases characterized by short incubation periods, serious illness requiring medical treatment, and those having recognized etiologies (Lee et al., 2002; Blackburn et al., 2004). Individual sensitivity and enhanced susceptibility among groups such as children, the elderly, and the immuno-compromised, further complicates the effectiveness and applicability of disease surveillance (WHO, 2003; NRC, 2004).

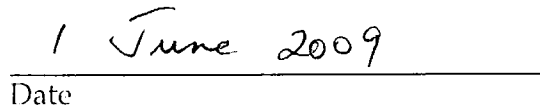
15. It is clear that many diseases are commonly under-reported, given the limitations of the passive disease surveillance systems presently in place in Oklahoma and elsewhere. Multiple factors play a role in whether disease outbreaks are recognized, investigated, and/or reported, which typically will result in under-reporting of the true illness rate (Lee et al., 2002; Blackburn et al., 2004; Liang et al., 2006; Craun & Calderon, 2006). Multiple studies (Lee et al., 2002; Yoder et al., 2004; Blackburn et al., 2004; Liang et al., 2006) have concluded that data which are collected most commonly pertain to "outbreaks," with no mechanism to include seemingly sporadic cases, and therefore the data do not necessarily represent actual endemic trends with waterborne illnesses. The

observations already available concerning disease occurrence in northeastern Oklahoma underscore the potential for increases in infectious diseases related to land disposal of poultry waste in large quantities.

16. Attachment A to this Affidavit presents the references cited herein.

17. I declare under penalty of perjury, under the laws of the United States of America, that the foregoing is true and correct.


Christopher M. Teaf, Ph.D.


Date

ATTACHMENT A

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